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JAS
O/FHE

OSA-3029/67

19 September 1967

MEMORANDUM FOR: Deputy for Operations, OSA

SUBJECT : Test Program for Mid-Air Modification of
the 35-Foot Cygnus Parachute Canopy

PURPOSE:

1. The purpose of the mid-air modification is to make the parachute steerable and more stable by cutting suspension lines on the inside of each rear riser after the parachute is fully opened. The modification will be similar to the mid-air modification (four-line-cut) approved on all Air Force 28-foot canopies. If the mid-air modification proves feasible on the 35-foot canopy it will enable the pilot to make 360° turns during descent, and survey the surrounding area for roads, streams, enemy action, etc., and steer to a good landing area. The present configuration of the canopy makes the parachute almost impossible to maneuver, even by a skilled parachutist.

2. The test program will be supervised by Headquarters Training and Equipment Branch, Intelligence Division/O/OSA. All tests will be conducted [] using existing equipment and aircraft. Costs not to exceed []

25X1

25X1

3. Equipment necessary to conduct the test program is in stock [] and consists of the following:

25X1

a. Two (2) Cygnus 35-foot personnel canopies (used).

b. Two (2) T-10 parachute assemblies, minus canopies.

Cygnus canopies will be packed in the T-10 parachute containers.

USAF review(s) completed.

GROUP 1
Excluded from automatic
downgrading and
declassification

S E C R E T

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EQUIPMENT REPAIR:

4. After each jump the suspension lines that were cut for the modification will be replaced at the base parachute shop.

AIRCRAFT FOR DROPS:

5. Detachment aircraft will be used (helicopters, C-47, or C-130) in conjunction with regularly scheduled flights.

PHOTO COVERAGE:

6. Photo coverage will be furnished by the detachment photo shop.

TEST JUMPS:

7. Test jumps will be made by [] and detachment parachutists. Jump altitude will be approximately 3,000 feet above terrain, with parachute opened by static line. Two (2) jumpers will exit on each pass; one will perform mid-air modification, the other will be for control.

25X1

NUMBER OF JUMPS:

8. The number of jumps needed to complete the test program will be determined by Headquarters Training and Equipment Branch.

25X1

[]
Chief, Intelligence Division
Office of Special Activities

INTEL/O/OSA [] (19 Sept 67)

Distribution:

- Orig - D/O/OSA
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25X1

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S E C R E T

AFTER CHUTE DEPLOYMENT

WARNING

Do not pull the survival kit release until the main chute is open.

Try to determine the wind direction, and land facing the wind. To turn, pull the left or right front riser strap to turn left or right respectively.

With Steerable Chute (-6/-6C)

A lanyard with a 7-inch loop is provided on each rear riser strap, tacked to the strap with breakaway thread. If the parachute is not damaged, pull each loop down approximately 1 1/2 feet with a sharp tug. This provides steerage by releasing three pairs of suspension lines on each side--24 pairs remain--and imparting a three to four ft/sec forward speed to the chute.

WARNING

Do not pull either loop if the chute has sustained damage.

NOTE

To obtain steerage speed, pull both loops. The chute will turn continuously if only one set of lines is released.

Start to employ the steering capability as soon as possible after chute deployment for maximum effectiveness. A 180° turn will require 20 to 30 seconds.

BEFORE LANDING

Pull the survival kit release handle when approximately 2000 feet above the landing point.

NOTE

- The release handle should be pulled rapidly through its complete arc of travel.
- Do not pull the kit release handle if a tree landing is expected.

For water landing:

- (a) Close faceplate before landing to prevent helmet from filling.
- (b) Inflate flotation gear:

Pull the inflator lanyard down firmly.

NOTE

The gear can not be inflated orally without first actuating the CO₂ lanyards.

- (c) Remove spurs if possible.

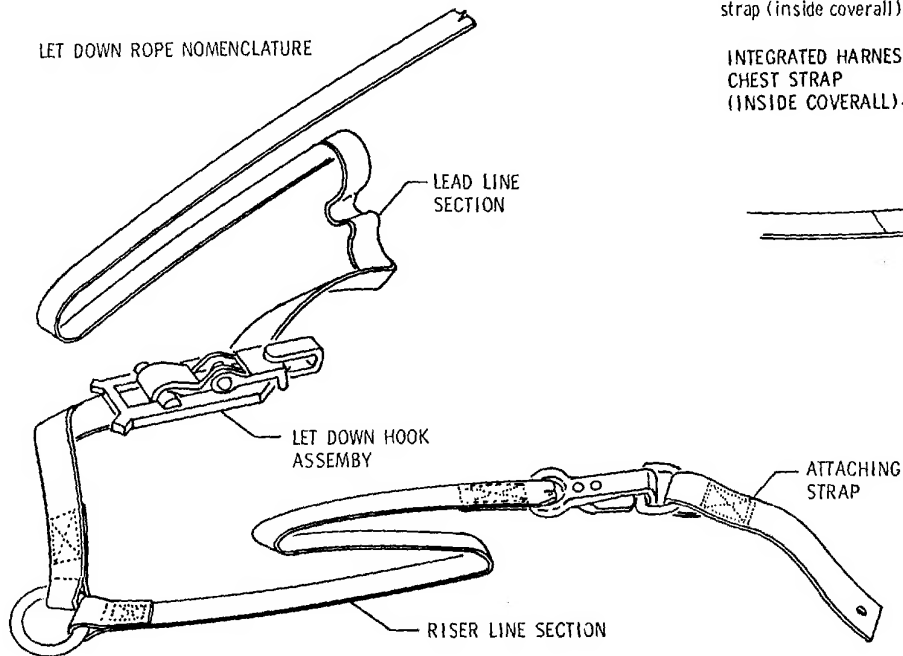
CAUTION

If retained, the foot spurs may puncture the dinghy if care is not exercised.

- (d) Release Koch parachute riser releases when in water.
- (e) Attach survival kit lanyard to hardware on suit. Release left and right seat kit straps while holding parachute bag for radio beacon retention. Beacon is stored in pocket of parachute bag.

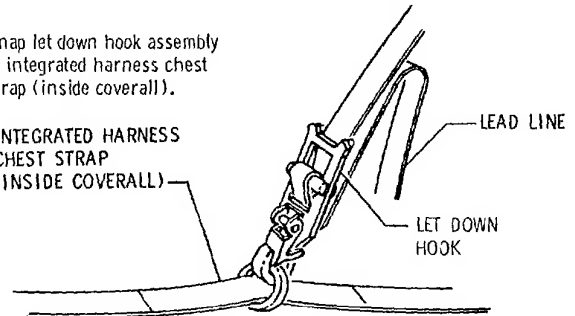
ATTACHMENT TECHNIQUE FOR LET DOWN ROPE AFTER TREE LANDING

LET DOWN ROPE NOMENCLATURE



D. Snap let down hook assembly to integrated harness chest strap (inside coverall).

INTEGRATED HARNESS CHEST STRAP (INSIDE COVERALL)

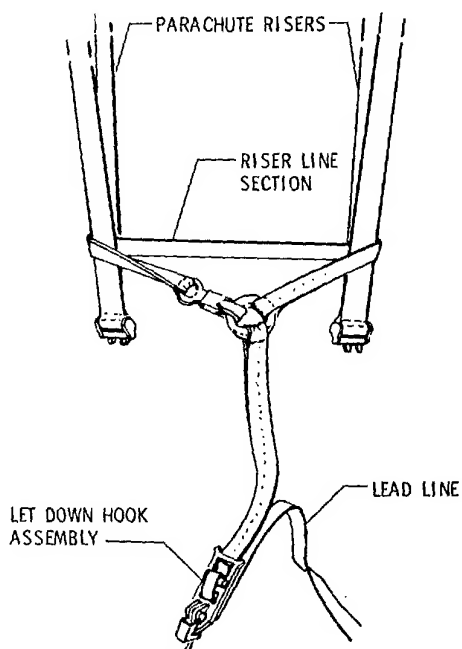


WARNING

Do not attach let down hook assembly to suit or harness cloth as the snap may open when crew member's weight is applied to the let down rope.

WARNING

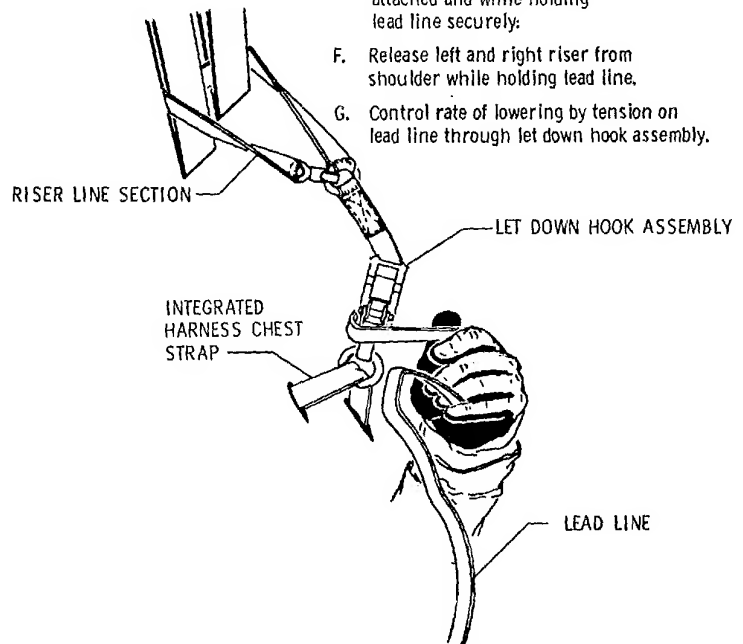
Recheck that all snaps and lines are attached properly before releasing riser attachments.



E. Loop riser line section through front straps of left and right risers and snap to ring.

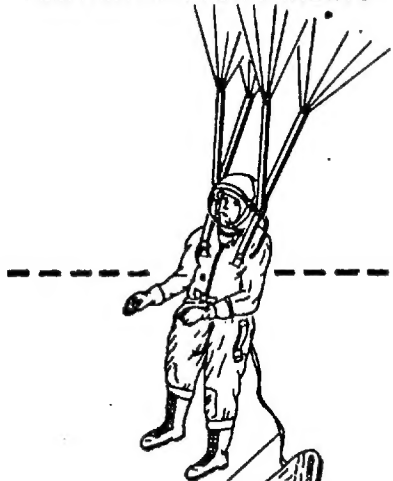
When all snaps and lines are attached and while holding lead line securely:

- F. Release left and right riser from shoulder while holding lead line.
- G. Control rate of lowering by tension on lead line through let down hook assembly.



DESCENT SEQUENCE

PREPARATION FOR LANDING



2,000 FEET ABOVE LANDING SURFACE

1. Pull survival kit release handle rapidly through its complete arc of travel
2. Prepare for landing
3. For water landing:

- A. Close faceplate
- B. Remove spurs if possible.

CAUTION

If retained, the foot spurs may puncture the dinghy if care is not exercised

- C. Inflate flotation vest before water entry by actuating lanyard, whether equipped with automatic immersion inflator or not.
- D. Release chute when in water
- E. Attach kit lanyard to suit.

LANYARD

CUSHION

DINGHY

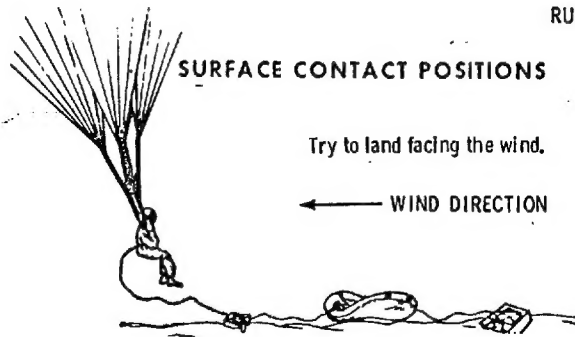
SURVIVAL KIT

RUKSACK

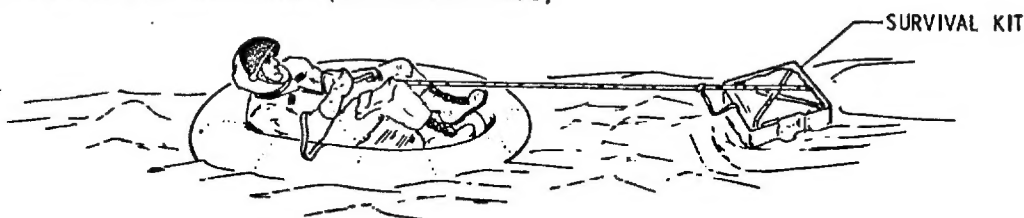
SURFACE CONTACT POSITIONS

Try to land facing the wind.

← WIND DIRECTION



RETRIEVAL OF SURVIVAL GEAR (WATER LANDING)



SURVIVAL KIT

AFTER CHUTE DEPLOYMENT

Steer by pulling left or right front risers.

With steerable chute:

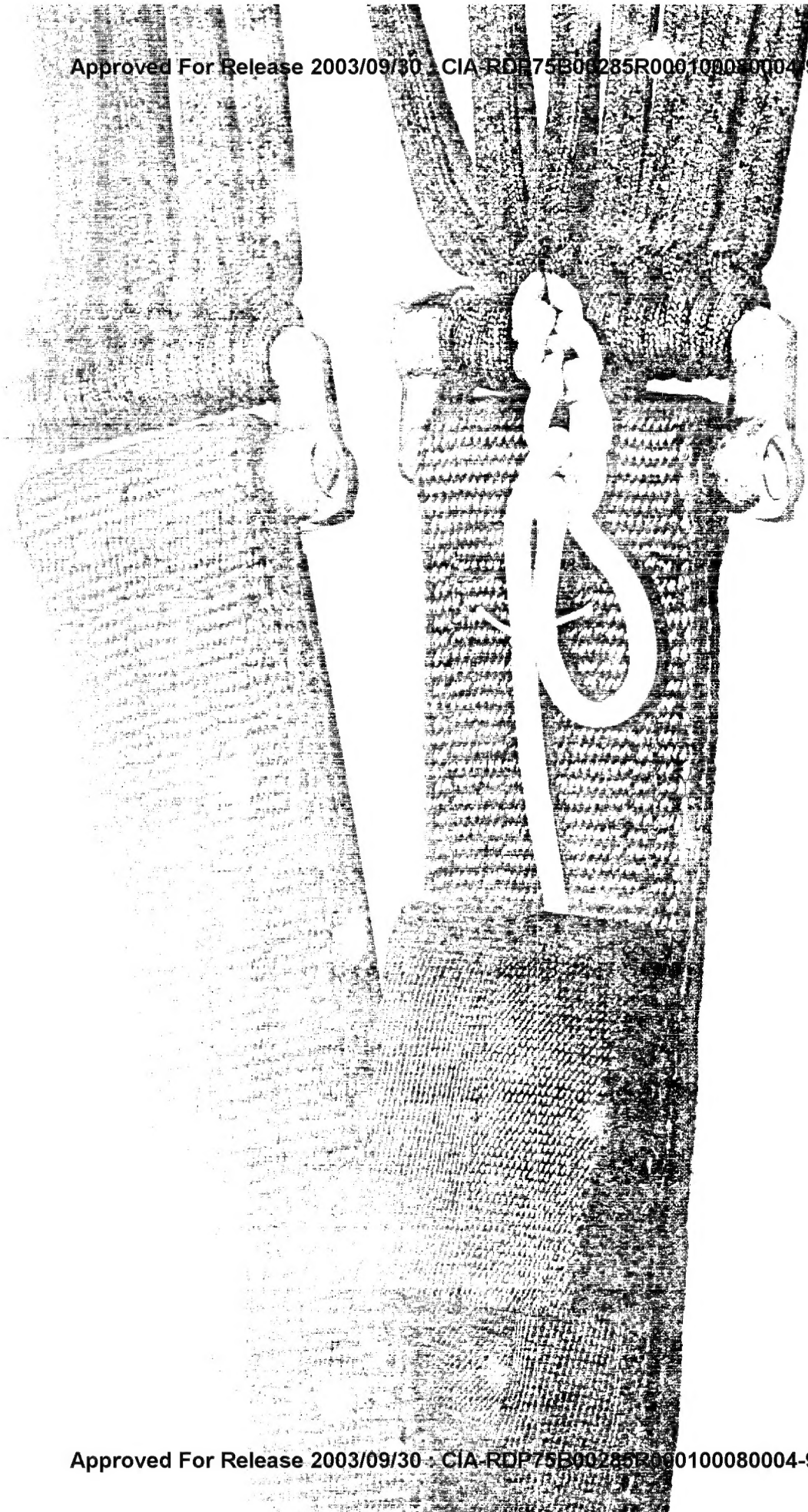
Pull loops to release slipknots of suspension lines from rear straps. Slip hand between riser straps and break tacking if risers are stuck together. (RQ-225-6f-6C chutes only.)



NOTE

- Kit touchdown relief can be felt prior to crewmember landing
- Retain helmet liner if possible, it can be used as a cap
- If signal fire built, stand away from fire area to simplify helicopter rescue
- Turn radio beacon off, after rescue is assured, to avoid interference with voice communications on the rescue frequency

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Rescission date: 1 November 1970

INSTALLATION OF FOUR LINE JETTISONING LANYARDS ON PERSONNEL PARACHUTES

NOTE

Commanders are responsible for bringing this publication to the attention of all Air Force personnel cleared for operation of affected system.

1. APPLICATION:

- a. This technical order is applicable to parachutes canopies and risers installed in personnel parachute assemblies. All flying personnel will, prior to next flight, be made aware of the effect this TCTO has upon the operation of this equipment.
- b. This modification will be accomplished on the following equipment.

MODEL	PART NO	Kits
C-12/CA-12	50C7023-12	C
BA-18	50C7024-18	A
B-20	50C7024-20	A
BA-21	50C7024-21	A
BA-22	50C7024-22	A
Force Deployed	811058-405	A
Force Deployed	65C1501	A
SA20	50C7025-20	B
S-21	50C7025-21	B
C-2 Canopy	50E6877-3	C

- c. The intent of this modification was accomplished on parachute assemblies by engineering office ASD.

2. PURPOSE:

This technical order directs installation of Four-Line Jettisoning Lanyards on personnel parachute canopies and risers to provide a capability of releasing the proper lines by the use of a simple pull action on the part of escapee, rather than cutting with hook-blade knife presently installed on risers.

3. WHEN TO BE ACCOMPLISHED:

Not later than 120 days after receipt of this technical order and parts. Failure to accomplish the work by 1 August 1970 shall be justification for withdrawing affected equipment from service until compliance is accomplished.

4. BY WHOM TO BE ACCOMPLISHED:

Organizational/field level maintenance.

5. WHAT IS REQUIRED:

- a. Supply Information and Requirements.

(1) Parts Required Per Parachute System.

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The following parts will be furnished as a complete kit for initial installation and will be requisitioned in accordance with T.O. 00-35A-15, Distribution Category "B", from FD2050, Kelly AFB, Texas. The allocation of available kits to requisitioning activities will be in accordance with "Priorities of Programmed Units." Delivery of kits is scheduled to begin about November 1968 and be completed by December 1968. If requisitioned Kits are not received within 30 days following the scheduled kit delivery completion date, notify FD2050. SAAMA Attn: SANDP, Kelly AFB Tex. Parts required for maintenance after initial installation will be requisitioned from the appropriate supply sources.

Quantity Kits	Kit Identification No.	Part No.	Nomenclature	Source
A B C	1670 K1400205A		Kit A - Modification of Back Style Parachute Assemblies Part Nos 50C7024-18, -20, -21, -22, 65C1501 (F106) and 811058-405 (F105) Consisting of the following parts.	AF Stock
1	1670 K1400205B		Kit B - Modification of Seat Style Parachute Assemblies Part Nos 50C7025-20 and -21. Consisting of the following parts.	AF Stock
1	1670 L1400205C		Kit C-Modification of Chest Style Parachute Assembly, Part No. 50C7023-12 and parachute canopies Part Nos 50E6877-2 and -3. Consisting of the following parts.	AF Stock
2 2 2		68C130	Lanyard - Line Jettisoning	
2		68C129-2	Flute - Riser Back Style	
2		68C129-1	Flute - Riser Seat Style	

The following material required to comply with this technical order is not furnished in the kit and will be obtained through the appropriate supply source.

Quantity	Stock No	Part No	Nomenclature	Source
24 inches approx	8310-194-4156	V.T. 276F	Thread - Cotton Type IV Ticket No 8/4 (formerly 3 cord)	AF Stock
36 inches approx	8310-194-4057	V.T. 276F	Thread - Cotton Type IV Ticket No 8/9 (formerly 6 cord)	AF Stock
40 inches approx	8305-281-3012	MIL-W-272 65 or MIL-W-4088	Webbing - Nylon Type XII Class R Olive Drab, or Sage Green, 1 23/32	AF Stock

(2) Action Required on Spares in Stock. The following parachute Assemblies and parachute components shall be modified in accordance with instructions contained in paragraph 6 by organizational/field maintenance prior to issue.

Stock No.	Part No.	Nomenclature
1670-802-8802LS	50C7023-12	Chest, Convertible Parachute
1670-801-1670LS	50C7024-18	Back Auto, Type Parachute
1670-805-9037LS	50C7024-20	Back Non-Auto Type Parachute
1670-802-8800LS	50C7024-21	Back Auto Type Parachute
1670-940-0787LS	50C7024-22	Back Auto Type Parachute
1670-782-9720LS	811058-405	Back Force Deployed Parachute

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Stock Number	Part No.	Nomenclature
1670-940-0761LS	65C1501	Back Force Deployed Parachute
1670-680-9025LS	50C7025-20	Seat Auto Parachute
1670-727-8660LS	50C7025-21	Seat, NON-Auto Parachute
1670-248-9246LS	50E6877-2	Parachute Canopy
1670-554-6413LS	50E6877-3	Parachute Canopy

(3) Parts Required to Modify Items in Stock. Same as paragraph 5a.(1).

(4) Disposition of Removed and Replaced Parts.

Stock Number	Part Number	Nomenclature
1670-779-1253	60C6037	Lanyard Cutter Pocket Knife

Return this item to applicable property class at SAAMA, Kelly AFB Tex.

(5) Drawings Required.

NA

(6) Size, Weight, and Cost of Parts Kits

Size	Weight	Cost
3" x 5"	1/4 lb	\$2.50 ea

(7) Disposition of Kits.

Kits remaining in stock after rescission date will be disposed of in accordance with instructions contained in AFM 67-1.

b. Personnel Information and Requirements.

Work Phase	AFSC Skills	Man-Hours Required
Inspection	58150	0.15
Install Jettisoning Lanyard	58150	1.0
Install Riser Flute	58150	0.30
Total Man Hours		1.45

c. Special Tools, Jigs and fixtures Required.

NA

6. HOW WORK IS ACCOMPLISHED:

a. Preliminary Check: Inspect canopy and risers to determine if jettisoning lanyard, Part No. 68C130, and flute, Part No. 68C129, as shown in figures 2 and 23 are installed. If affirmative, annotate AF Form 46 to indicate work previously accomplished.

b. Installation of Flute on Back and Seat Style Parachute Risers.

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(1) Position the flute webbing on the rear inside of each (right and left) riser strap with the turned back ends of flute webbing outside. Center flute webbing between edges of riser webbing. Stitch side edges of flute to riser with one row of size E nylon thread on each side of flute. Stitching shall be approximately one-eighth inch from edge of flute. Ends of flute must remain open to allow passage of jettisoning lanyard (See figure 1).

NOTE

Prior to installing flute on seat type parachute riser, inspect riser to determine if Grip Stop is installed. If affirmative, carefully remove it by cutting stitches that join the Grip Stop and riser.

WARNING

Extreme care shall be taken to assure riser is not damaged when removing Grip Stop.

c. Installation of Jettisoning Lanyard on Canopies.

NOTE

Jettisoning lanyard may be received in a completely unchained condition. If so, shorten the lanyard by weaving a series of daisy chain loops as shown in figure 16 through 19 and described in paragraph 6.c.(11).

(1) Starting with either the right or left rear riser strap, separate the connector link and slip all lines off, taking care to keep them in order. Slip the small end loop of the lanyard onto the link followed by lines 3 through 7 or 27 through 22, depending on which strap you have started with.

NOTE

Lines 1 and 2 or 28 and 27 are free. See figure 2.

NOTE

If open end of link is to the inside, only the two jettisonable lines need to be slipped off link to install the end loop of the lanyard on the link.

(2) Prepare the loops in the ends of the lines as shown by steps No. 2 and 3, figure 3.

(3) Form a bight in the jettisoning lanyard, several inches long at first, and thread the doubled lanyard through the line loops as shown by Step No. 4 figure 3. The line has previously been positioned under the link as shown, and the bight of the lanyard threads over the link to ultimately form the first coupling daisy chain, (See figures 4 and 5).

(4) Form a second coupling daisy chain as shown by Step No. 5, figure 2 and figure 6.

(5) Bring the loop of the second daisy chain along side the lanyard and handtack as shown by Step No. 5, figure 3 and figure 6.

WARNING

Take care to hand tack exactly as shown and with the specified Type IV Ticket No 8/4 cotton cord (formerly 3 cord). This tacking must serve to keep the daisy chain from unravelling but must also break readily by a sharp tug on the pull loop by the escapee.

(6) Using a wire loop, draw a pull cord through the flute and attach to the lanyard pull loop in preparation for inserting the lanyard into the stow flute (See figure 7).

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T.O. 14D1-2-1

**TECHNICAL MANUAL
OPERATION**

PERSONNEL PARACHUTES

AF 41(608)34477

CHANGE
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PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

1 APRIL 1965

CHANGE 2 - 15 DECEMBER 1966

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NOTE. The portion of the text affected by the current change is indicated by a vertical line in the outer margins of the page.

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 54 CONSISTING OF THE FOLLOWING:

Page No.	Change No.	Issue	Page No.	Change No.	Issue
*Title	2	15 Dec 66			
*A	2	15 Dec 66			
1 thru ii . . . . .	. . . .	Original			
1-1 thru 1-2 . . . . .	. . . .	Original			
2-1 thru 2-14 . . . . .	. . . .	Original			
3-1 thru 3-8 . . . . .	. . . .	Original			
3-9 thru 3-10	1	25 Feb 66			
3-10A Added	1	25 Feb 66			
3-10B Blank	1	25 Feb 66			
3-11	1	25 Feb 66			
3-12 thru 3-14 . . . . .	. . . .	Original			
3-15	1	25 Feb 66			
3-16 . . . . .	. . . .	Original			
*3-17	2	15 Dec 66			
3-18 thru 3-19 . . . . .	. . . .	Original			
3-20	1	25 Feb 66			
3-21 thru 3-22	Original			
3-23	1	25 Feb 66			
3-24 Blank	Original			
4-1 thru 4-8	Original			

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A Change 2 — 15 December 1966

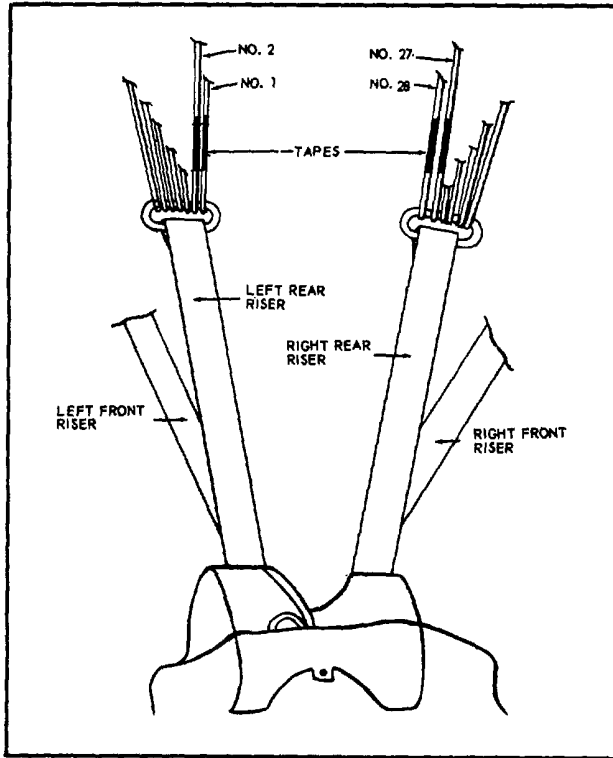


Figure 3-27. Marked Suspension Lines

or practiced in the technique, extreme care should be taken.

1. Visually locate line 1, 2, 27 and 28 having identification tapes installed. Newer parachutes will have small red fabric tapes in lieu of adhesive tape markers. (See figure 3-27.)

2. Remove your knife from the pocket located on your flying suit or on the right front riser and hold it in your right hand. Starting with the left rear riser, grasp it above the grip-stop and pull it down to a point where the marked suspension lines can be reached with the hand held knife. Visually identifying the marked suspension lines, apply the knife blade to the lines to be cut (hook opening out and away from the unmarked suspension lines) and make the cut. Then allow the hand held riser to raise arm's length and release. Transfer the knife to the free hand and repeat the procedure for the second rear riser suspension line cut.

NOTE

After the four lines have been cut, and time permits, cut the lanyard and allow the knife to fall free, or stow it between the riser and riser knife pocket (See figure 3-28.). After using the MC-1 knife, replace it in the flying suit leg pocket.

b. The cutting of the four suspension lines will cause a large "lobe" or "scallop" to form in the rear

center portion of the canopy skirt. (See figures 3-29 and 3-30.)

c. The "lobe" provides a facility for turning the canopy at the approximate rate of 30 degrees per second and will also significantly reduce oscillations.

d. To turn the canopy, grasp the appropriate riser (i.e. right rear riser for a right turn and left rear riser for a left turn) and pull down. Release the riser when the turn has approached the direction in which you wish to be oriented. Reference figure 3-31.

e. The modified canopy will inherently glide in the direction you are facing at a rate of 3 to 4 knots in still air. Use this inherent drift to your best advantage when maneuvering toward a suitable landing area by either increasing or counteracting the drift caused by prevailing winds.

f. Always give yourself time to turn the canopy so you are facing into the wind for landing, and get this done before you reach 200 feet from the ground so you are not in an awkward landing attitude. This "upwind landing" permits the inherent canopy glide to counteract the prevailing wind to some degree and reduces rather than adds (as in a downwind landing) to chances of landing injury.

3-42. GROUND LANDING.

a. At about 500 feet, check your probable landing spot for obstacles, reach a full arm's length above your head and grasp both right risers in your right hand and both left risers in your left hand. Unless there is evidence of a very high ground wind (excess of 15 knots), such as you would probably encounter landing in a storm area, do not bother the canopy releases.

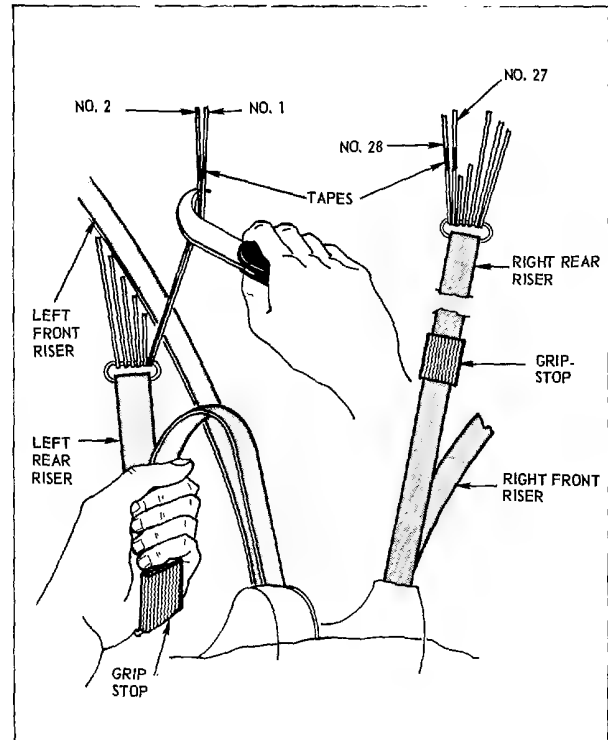


Figure 3-28. Cutting Marked Suspension Lines

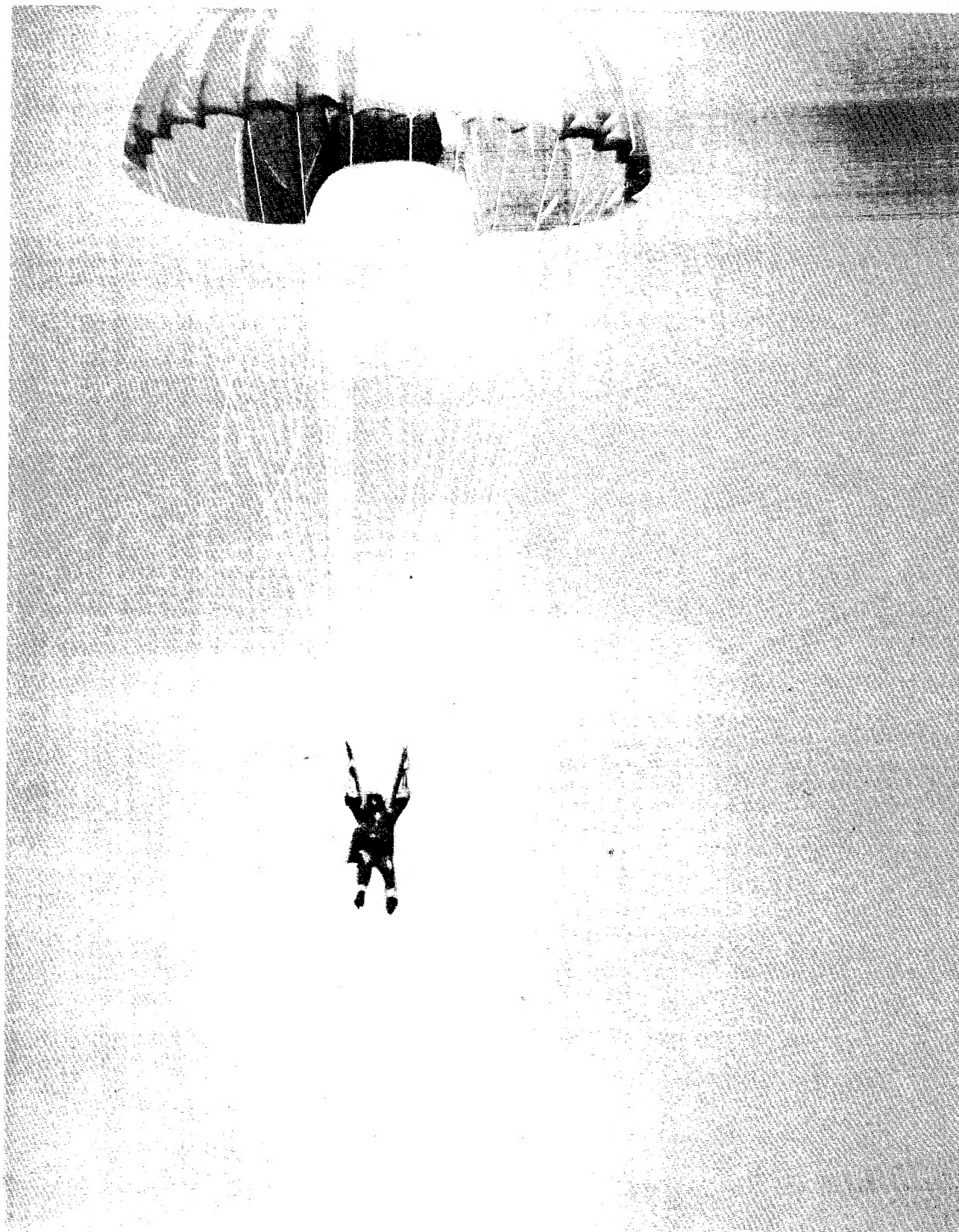


Figure 3-29. Suspension Lines Cut - Front View

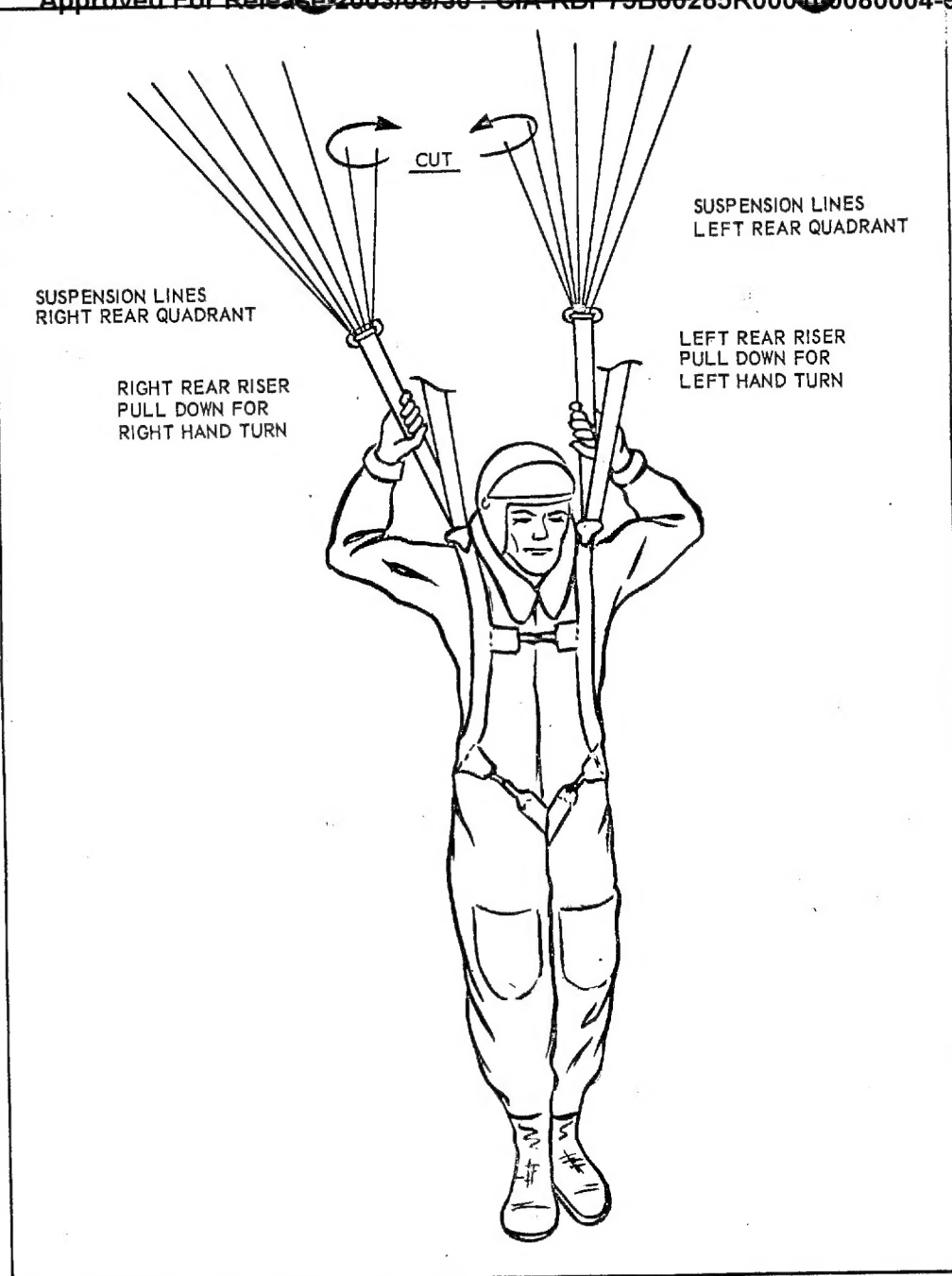


Figure 3-27. Turning Canopy

d. To turn the canopy, grasp the appropriate riser (i.e. right rear riser for a right turn and left rear riser for a left turn) and pull down. Release the riser when the turn has approached the direction in which you wish to be oriented. (Reference figure 3-27.)

e. The modified canopy will inherently glide in the direction you are facing at a rate of 3 to 4 knots in still air. Use this inherent drift to your best advantage when maneuvering toward a suitable

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f. Always give yourself time to turn the canopy so you are facing into the wind for landing, and get this done before you reach 200 feet from the ground so you are not in an awkward landing attitude. This "upwind landing" permits the inherent canopy glide to counteract the prevailing wind to some degree and reduces rather than adds (as in a downwind landing) to chances of landing injury.

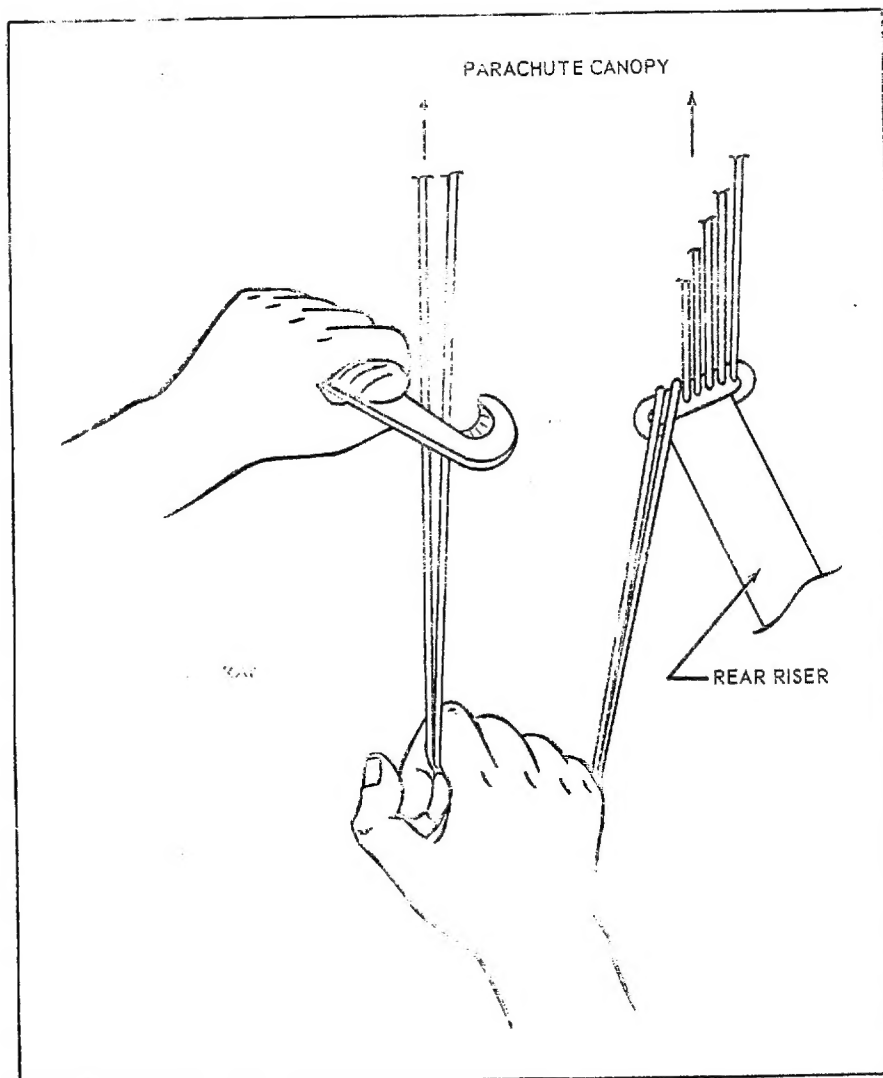


Figure 3-24. Cutting Marked Suspension Lines

3-54. MID-AIR MODIFICATION FOR STEERABILITY.

a. The following procedures can be safely utilized to reduce oscillations and provide a capability for turning and steering the parachute canopy.

2. Starting with either rear riser, pull the riser down and grasp the two marked suspension lines with one hand. Sever the two marked suspension lines with hook knife, carried in pocket of flying clothes. (See figure 3-24.)

3. Repeat step 1 and 2 on the remaining rear riser to complete the mid-air canopy modification.

b. The cutting of the four suspension lines will cause a large "lobe" or "scallop" to form in the rear center portion of the canopy skirt. (See figures 3-25 and 3-26.)

c. The "lobe" provides a facility for turning the canopy at the approximate rate of 30 degrees per second and will also significantly reduce oscillations.

These procedures should not be attempted when parachute opening occurs below 500 feet.

1. Visually locate lines 1, 2, 27 and 28 having identification tapes installed. (See figure 3-23.)

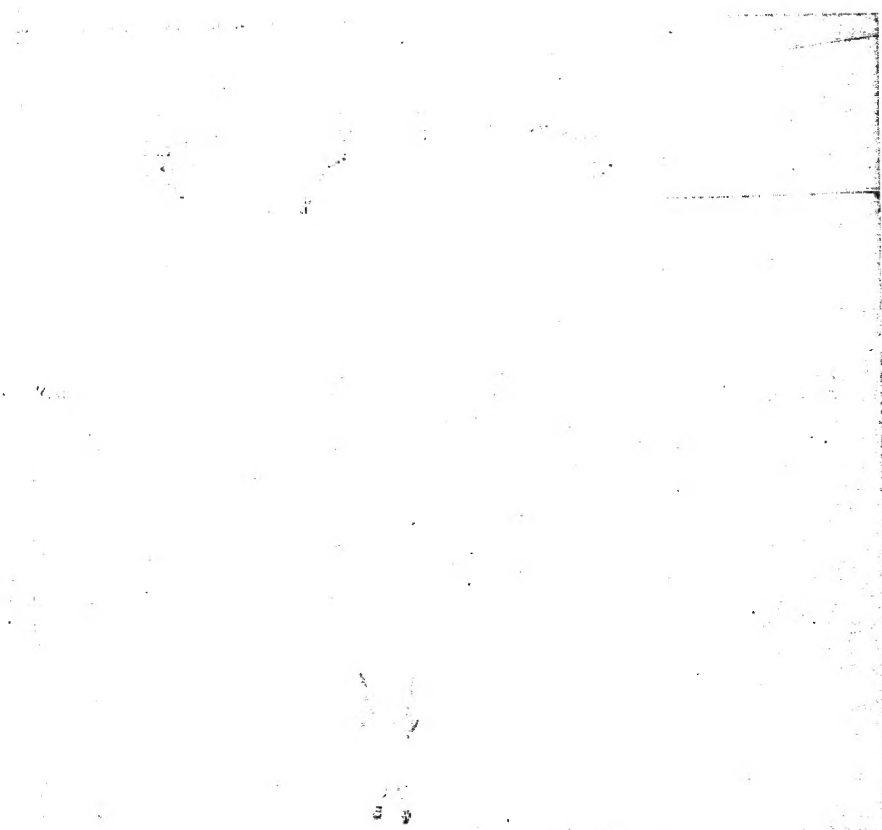


Figure 3-25. Suspension Lines Cut - Front View

